National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials Investigations

Washington, DC 20594

Amtrak Passenger Train 516 Derailment

Vancouver, British Columbia, Canada

December 17, 2018

Talgo Series VI Trainset Examination

Accident Summary

On December 17, 2018 at about 11:50 am pacific daylight time, Amtrak train 516 with passengers aboard, operating with lead locomotive WDTX1407 and 13 cars (Mt. Olympus Talgo trainset) was reported to have derailed 3 cars while performing a reverse movement on a loop track overtop a switch in Vancouver, British Columbia. See figure 1.

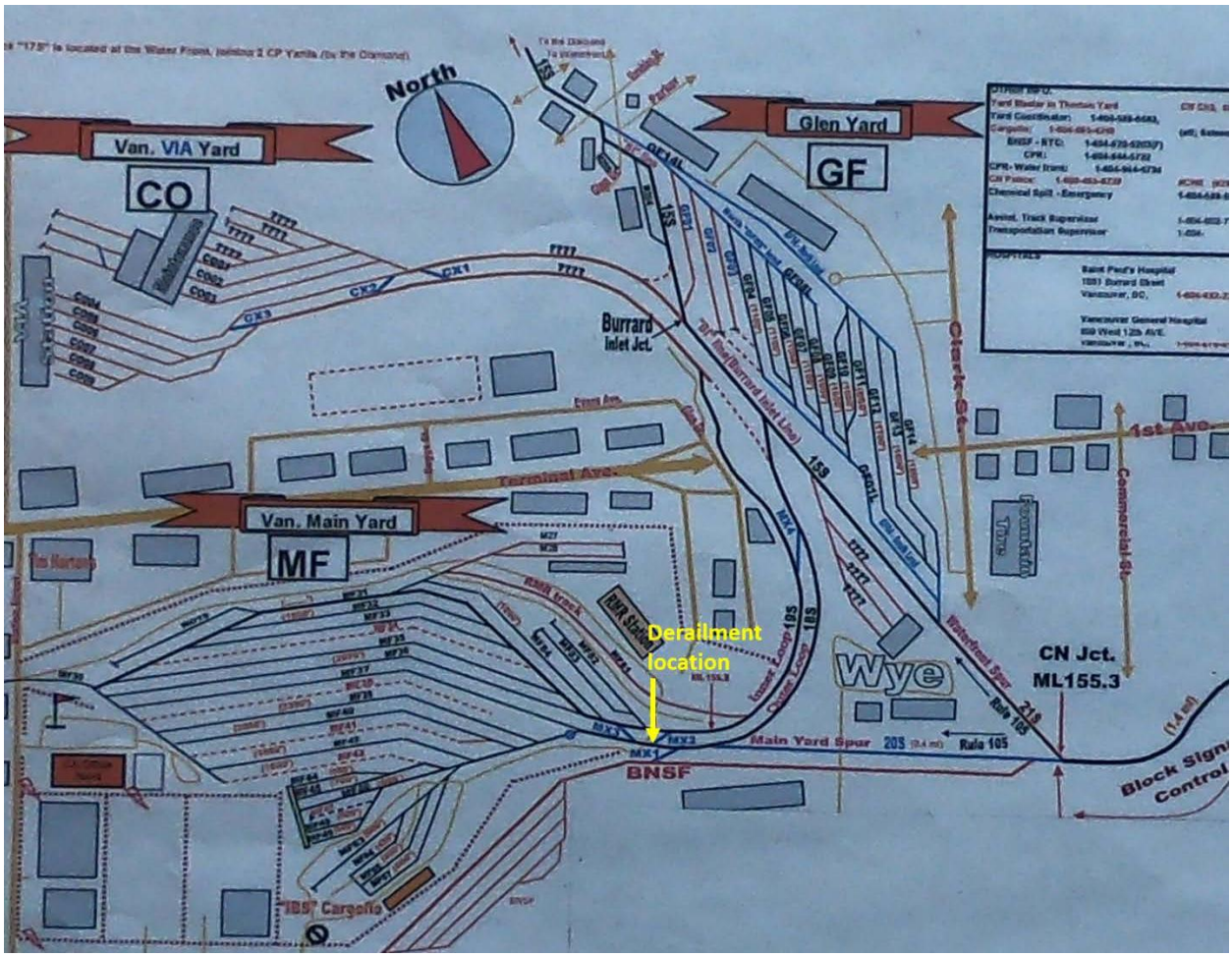

Figure 1. Derailment location.

The derailment occurred at the Canadian National Railway Company (CN) Yard at MP 130.8, Yale Subdivision, approximately 1 mile south of the Vancouver Pacific Central Station. Train 516 typically includes a cab car on one end of the trainset enabling it to proceed directly into the terminal without a need to turn the train around. On the day of the derailment, there was not a cab car on train 516 so in order to set the train movement up to depart the terminal with a controlling locomotive in the front, the train was to move from the main yard spur track onto the outer loop track far enough to have the rear of the trainset to clear CN Junction ML155.8 (hand

thrown switch, located at the junction of the mainline spur and the outer loop) then reverse move around the loop track into the terminal. After train 516 moved through ML 155.8, part of the trainset remained over top of the MX2 switch.[1] When the train began reversing on the outer loop track, three cars were reported to have derailed over the MX2 switch and two cars from the trainset struck a nearby freight car, AMTK7522 and AMTK 7419. See figure 2.

Figure 2. Train 516 derailed into freight cars.

[1] Switch MX2 is a variable type switch, therefore, moving through the switch in the trailing direction should have automatically lined the switch for normal, and changed the target signal indication to green if the mechanism is functioning properly.

The cars came to rest leaning on freight equipment occupying an adjacent track. Upon inspection of the MX2 switch it was observed to be lined in the diverging move position with a yellow target indication. At the time of the incident, no injuries were reported by employees, or passengers. According to Amtrak, the train was moving at 3 mph when it derailed into the adjacent freight cars.

The passengers were transferred from train 516 to buses and taken to a nearby local police station for customs processing. Amtrak's Pacific Northwest superintendent requested that all equipment and track structure remain in place after the time of the derailment until Amtrak personnel arrived. CN did not comply and moved the adjacent freight equipment train 516 was resting on (possibly resulting in further damage to train 516) and began performing track work and repairs prior to any Amtrak personnel arriving. CN re-railed train 516 at approximately 7:12 pm PDT on December 17, 2018 and relocated it to track 40.

Examination

On December 20, 2018, a preliminary examination of the damage to the Talgo Series VI trainset was completed by NTSB and Amtrak personnel at Amtrak's shops located in Seattle, WA. The train was a total of 623-feet long and weighed 685,710 lbs. The Charger locomotive is owned by WSDOT, and the rest of the Mt. Olympus trainset was owned by Amtrak and operated by Amtrak. See table 1.

Sequence	Car type	Road number	Weight (lbs.)	Length (feet)
1	Locomotive	WDTX 1407	265,000	71.5
2	Power	AMTK 7901	43,220	38.7
3	Passenger, business class	AMTK 7453	30,650	43.1
4	Passenger, business class ADA	AMTK 7553	30,650	43.1
5	Passenger, dining	AMTK 7803	27,780	43.1
6	Passenger, bistro	AMTK 7304	31,090	43.1
7	Passenger, coach class ADA	AMTK 7503	31,090	43.1
8	Passenger, coach class	AMTK 7522	31,090	43.1
9	Passenger, coach class	AMTK 7419	31,090	43.1

10	Passenger, coach class	AMTK 7418	31,090	43.1
11	Passenger, coach class	AMTK 7417	31,090	43.1
12	Passenger, coach class	AMTK 7416	31,090	43.1
13	Passenger, coach class	AMTK 7415	31,090	43.1
14	Baggage	AMTK 7103	39,690	38.7
Total			685,710	623

Table 1. Mt. Olympus trainset.

The damaged cars, AMTK 7522 and AMTK 7419, exhibited indications on the right sidewall of their car bodies consistent with a raking collision. AMTK 7522 exhibited two tears in the sidewall near the side passenger door. The door was also damaged during the collision and was removed during the recovery operation. See figure 3. The longest tear was measured to be about 4-feet in length occurring at the mid-point of the door, extending toward the passenger window. The other tear was measured at 18-inches in length. The side of the car was abraded from being in contact with the freight car. The height of the abrasion was measured at 38-inches. The passenger door was found inside of the car, placed there after the derailment. The damage to the side door is shown in figure 5. The door's window was broken, and the exterior aluminum covering was torn and damaged. Based on all observations to AMTK 7522, there were no indications passenger occupied space was compromised.

Figure 3. Damaged sidewall of AMTK 7522.

Figure 4. Close up view of the 4-foot tear on AMTK 7522.

Figure 5. Damaged side passenger door from AMTK 7522 laying inside the coach.

AMTK 7419 was abraded along its right side wall without significant compromise of the structure. See figure 6. There were two areas such that the sidewall was torn and fractured. One passenger window was broken, likely from contact with the freight car when it derailed.

Figure 6. Sidewall damage of AMTK 7419.

The tower mount structures that are located on the supported ends of the Talgo Series VI trainset are located at the top of the end-wall, on the right and left side. The tower mounts began to experience fatigue failure (Amtrak defines this as 'fissures') in 2005 and require periodic inspections to monitor the issue. See figure 7. The tower mount fissure inspection was completed by Talgo personnel and witnessed by NTSB on AMTK 7522 and AMTK 7419. There were no fissure cracks identified. Additional examination of these mounts revealed no indication of failure.

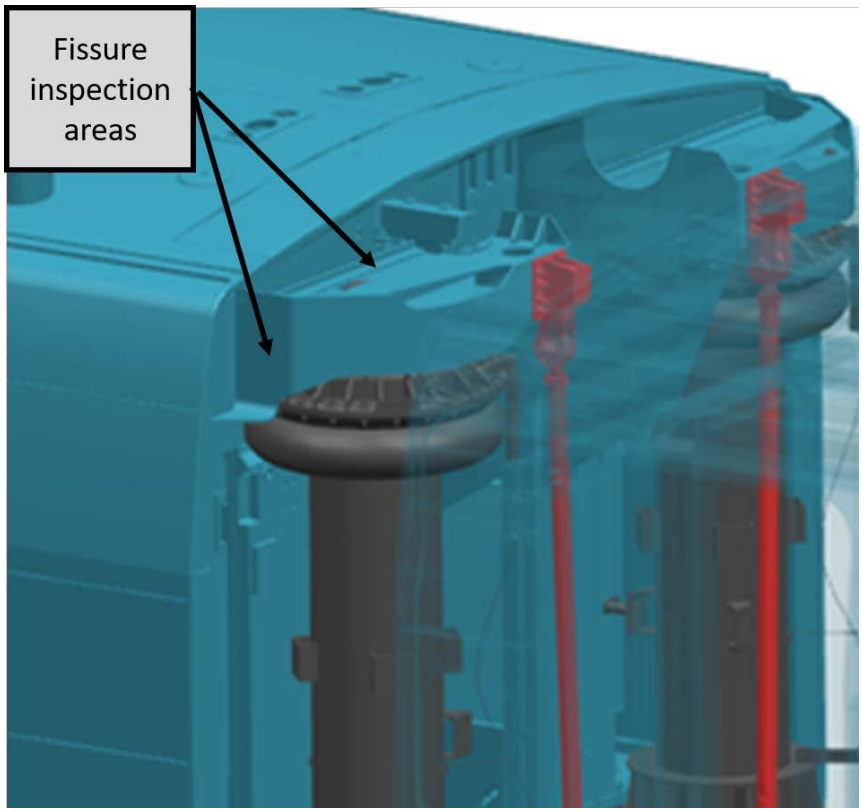

Figure 7. Fissure crack inspection areas.

The rolling assemblies from AMTK 7522 and AMTK 7419 were observed to be intact and undamaged. The rolling assembly retention straps were all intact. The wheels were observed to have full flanges and the wheel tread appeared to be normal. There were indications on the assemblies consistent with them derailing however, the damage was minimal.

On the evening of December 21, 2018, Amtrak and Talgo maintenance personnel separated the articulated connections between AMTK 7522 & AMTK 7419, and AMTK 7418 & AMTK 7419. See figure 8. NTSB and Amtrak personnel completed examinations to the carbody end-wall areas and articulated couplers on December 22, 2018.

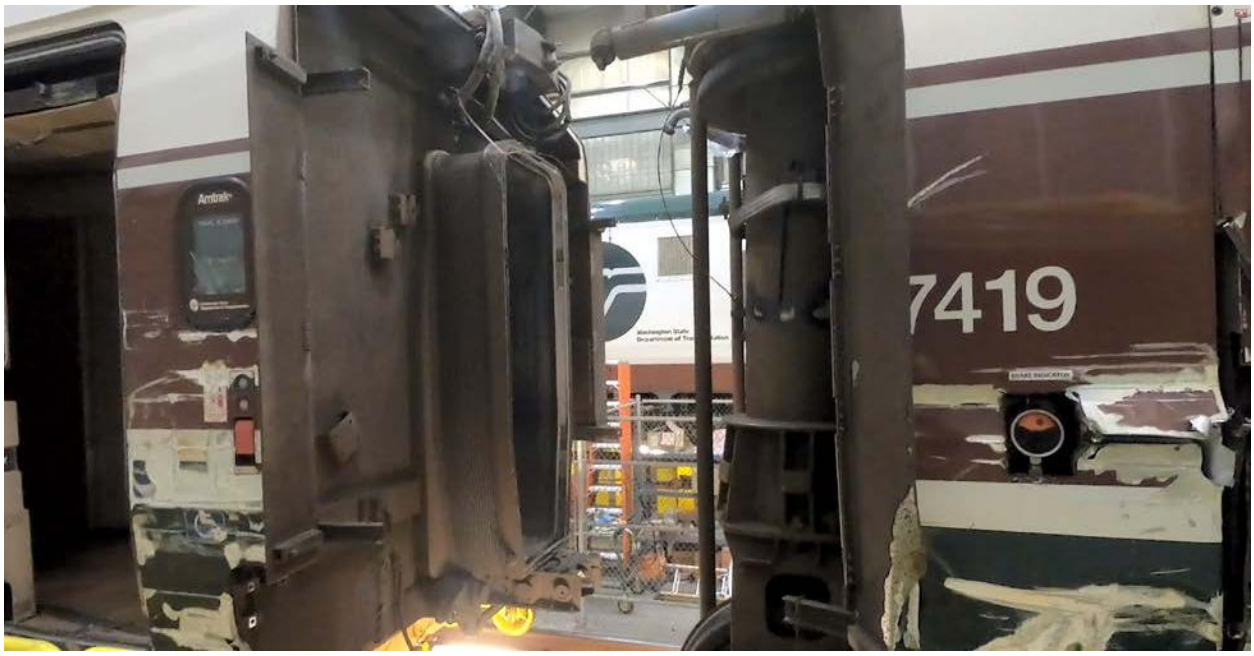

Figure 8. Separated cars, AMTK 7419 and AMTK 7522.

There was no significant structural damage observed to the end-walls of these cars. The articulated connection between the cars was visually inspected with no indication that is was overloaded or broken. The pin connection was removed from the draft pocket on AMTK 7522 by Talgo maintenance personnel and closely examined. No indications of overloading, bending or cracking were observed.

Figure 9. Articulated connecting pin, AMTK 7522.

Figure 10. Connection pin, AMTK 7522.

End of examination report.

Acknowledgment Signatures

The undersigned designated representatives attest that the information contained in this report is a factually accurate representation of the information collected during the examination, to the their best knowledge.

Signed_____ Date 12/22/2018

Jesse Milner, Amtrak Lead System Safety Specialist

Signed_____ _____ Date 12/22/2018

Carlos Luna, Amtrak Mechanical Superintendent